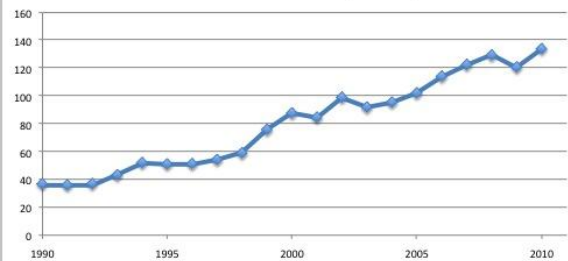


Beginning of the decline...



Irkutsk Oblast' TB incidence per 100,000



TB in Russia vs Irkutsk Oblast

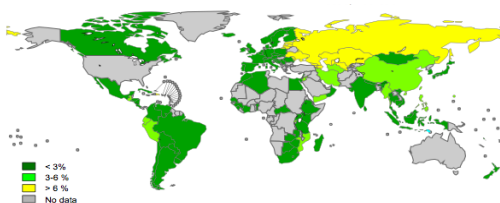
	Russia (2009)	Irkutsk Oblast' (2010)	US (2009)
Incidence (per 100,000 pop)	106	147	4.1
Prevalence (per 100,000 pop)	132	396	4.5
Mortality (per 100,000 pop)	18	44	0.2

Irkutsk Oblast' vs. Virginia

	Virginia (2010)	Irkutsk (2010)
Population	8,001,024	2,428,700
Size	39,490 sq mi	296,487 sq mi
New TB cases	268	3,351
TB + HIV cases	8	547
TB Mortality	15	1,101
Mono-drug resistant	13%	>60%
MDR	0	??

ANTI - TUBERCULOSIS DRUG RESISTANCE IN THE WORLD

MDR-TB among new TB cases 1994-2007
(MDR Tb = INH-R and RIF-R)



Irkutsk Oblast' vs. Virginia

	Virginia	Irkutsk
Screening for active TB	None	Fluorography
Screening for LTBI	TST/ IGRA	TST for kids
Sensitivity testing	Routine	Intermittent → 90% LJ agar, indirect method 10% MGIT when available
Contact tracing	Contacts get screened for LTBI, then treated if +	Fluorography, TST, sputum, PE. All contacts are treated Daily cleaning at home

Screening

- **Fluorography (>15 yo)**
 - Biennial- general population
 - Annual – intermediate risk
 - Semiannual – high risk
- **TST (12 mo-17 yo)**
- **Microbiological sputum studies**
- **Clinical**



Fluorography Screening

Yearly	Twice a year
<ul style="list-style-type: none"> • Chronic non-specific pulmonary, GI and GU illnesses • Diabetes mellitus • Steroids, radiation or chemotherapy • Homeless • Migrant populations, refugees • People residing in hospitals, homeless shelters, etc • Employees of institutions that provide social services to children and adolescents, medical settings, educational settings, sport camps, etc 	<ul style="list-style-type: none"> • Military • Employees of obstetric institutions/divisions • Contacts of known TB patients • People successfully treated for TB within the last 3 years • People successfully treated for TB but continue to have radiologic findings on CXR within 3 years of dx • HIV positive • People in psychiatric/drug abuse institutions • People in the correction system currently or within the last 2 years

Patient 08382

- 51 yo M whose was first diagnosed with TB in Nov 2010 when he presented with weakness and productive cough.
- He was treated inpatient from 11/13/10 to 2/19/11 at a local facility in Nizhneudinsk, Siberia.
- After discharge, he continued his treatment in the ambulatory setting. It is unclear how adherent he was with his treatment.
- In the process of treatment, he developed cavitary TB in the R upper lobe. According to the records, he was being treated with an 'individualized regimen' of Rif, PZA and Ethambutol
- When the diagnosis of cavitary TB was established on imaging, pt was referred to the TB dispensary in Irkutsk for evaluation.

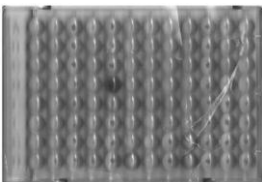
Patient 08382

- He was admitted to the dispensary on 6/8/11 (7 months after treatment initiation) and Rif, PZA and Ethambutol were re-started.
- Pt received a segmental resection of S1/2 of the R lung on 7/6/11. On 7/8/11, regimen was changed to Rif, PZA, Ethambutol, Kanamycin and Ciprofloxacin.
- Sputum collected on 7/20/11, culture positive 3 weeks later, DST finalized 6 weeks later.
- However pt was discharged on 8/5/11 due to behavioral problems. The discharge meds were Rif, PZA, Ethambutol and Cipro, which he was to take for 4 months. After which he was to undergo two "prophylactic" treatment periods of Rif, PZA, Ethambutol for 2 months each.

Patient's drug susceptibility testing

#08382 male 1960

	1	2	3	4	5	6	7	8	9	10	11	12
A	32	8	16	16	32	16	64	40	256	4	40	32
B	16	4	8	8	16	8	32	20	128	2	20	16
C	8	2	4	4	8	4	16	10	64	1	10	8
D	4	1	2	2	4	2	8	5	32	0.5	5	4
E	2	0.5	1	1	2	1	4	2.5	16	0.25	2.5	2
F	1	0.25	0.5	0.5	1	0.5	2	1.2	8	0.12	1.2	1
G	0.5	0.12	0.25	0.25	0.5	0.25	1	0.6	4	0.06	0.6	0.5
H	0.25	0.06	0.12	0.12	0.25	0.12	0.5	0.3	2	0.03	+	+
	OFL	MXF	RIF	AMI	STR	RFB	PAS	ETH	CYC	INH	KAN	EMB



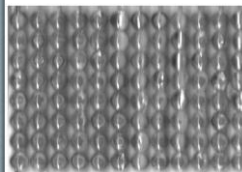
Resistant to:
Rifampin
Isoniazid
Kanamycin
Streptomycin

Susceptible to:
Amikacin?
Ofloxacin
Moxifloxacin
Ethambutol
Rifabutin
PAS and Cycloserine

A very scary TB isolate from a different patient

#09731 male 1971

	1	2	3	4	5	6	7	8	9	10	11	12
A	32	8	16	16	32	16	64	40	256	4	40	32
B	16	4	8	8	16	8	32	20	128	2	20	16
C	8	2	4	4	8	4	16	10	64	1	10	8
D	4	1	2	2	4	2	8	5	32	0.5	5	4
E	2	0.5	1	1	2	1	4	2.5	16	0.25	2.5	2
F	1	0.25	0.5	0.5	1	0.5	2	1.2	8	0.12	1.2	1
G	0.5	0.12	0.25	0.25	0.5	0.25	1	0.6	4	0.06	0.6	0.5
H	0.25	0.06	0.12	0.12	0.25	0.12	0.5	0.3	2	0.03	+	+
	OFL	MXF	RIF	AMI	STR	RFB	PAS	ETH	CYC	INH	KAN	EMB



Susceptible only to PAS, Cycloserine and +/- Ethambutol?

Rifabutin retained susceptibility in the limited number of isolates tested

Indication	Initial phase	Continuation phase
Primary TB, +sputum	4 drugs (INH, Rif, PZA, and Str or EMB) for 2 months	2 drugs (INH, Rif) for 4 mo (pulmonary) or 6 mo (extra-pulmonary), or 8-12 mo (TB meningitis) OR INH+ Emb for 6 months
previous TB but "low risk" of resistance	5 drugs (INH, Rif, PZA, EMB, Str) for 2 mo, then 4 drugs (INH, Rif, PZA, EMB) for 1 months	3 drugs (INH, Rif, Emb) for 5 mo
High risk of resistance	4 drugs (INH, Rif/Rfb, PZA, Emb) and 2-3 second-line drugs based on sensitivities in the region (choose from PAS, Cipro, Cycloserine, Ethionamide) for 3 months	Per sensitivities
MDR	≥ 5 drugs to which TB is sensitive (eg PZA, Cipro, Kan/Amik or Cap, Ethionamide and Ethambutol) for ≥ 6 months	≥ 3 drugs to which TB is sensitive for min 12 mo

Surgical Treatment

- Resections
- Lobectomy
- Pneumonectomy
- VATS/Thoracostomy
- Thoracoplasty



Indications for Surgery

- ineffective chemotherapy
 - no improvement on CXR, persistent positive sputums, cavity that doesn't decrease in size (after 5-6 months of tx) // tuberculoma >2 cm
- complications from TB
 - pulmonary bleeds, pleural empyema, spontaneous PTX, fistula
- Ddx (TB vs cancer): usually with open biopsy
- Consequences of TB: bronch stenosis, bronchoectasia, bronchiolitis, aspergilloma
 - concern that cavities from TB may become a nidus for other bacterial and fungal organisms.
- Social factors: quicker return to work (eg. teachers)
- In pts with MDR, the threshold for surgery is **much** lower

When all else fails...

- Thoracoplasty – usually resect 5-7 ribs on the side of the affected lung and patient wears a compressive band for ~2 months
- Performed when lung resection is contraindicated
- Thought to assist with closure of a cavity



Access



Summary



TB control and prevention in the U.S. is effective and should be applauded and strengthened: when public health systems fail, the consequences impact us all

In the U.S. we rely heavily on a well-resourced laboratory system for clinical decision making: improvement of laboratory capacity abroad would better inform our own care of foreign-born TB patients

With access to similar methods (PPD, TB medications, nurses, dispensaries), the definition of "cure" and "treatment" carry different cultural meaning and expectation: impacts our approach to therapeutic relationship among foreign-born TB patients

Thank you

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